

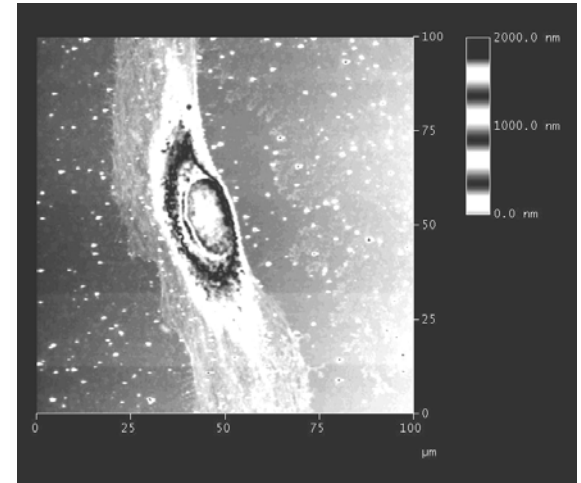
Acquisition of Atomic Force Microscope

Dr. M.K. Mazumder, University of Arkansas at Little Rock, DMR-0116712

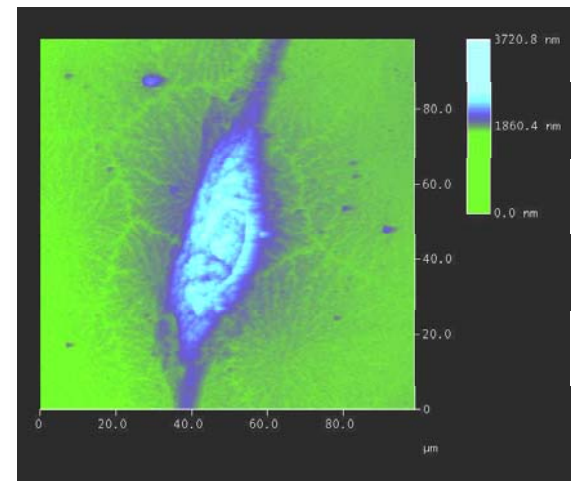
Endoluminal Arterial Stents have become one of the more important implants in interventional cardiology today. Current research is being performed on a novel stent coating¹ that discourages restenosis (re-narrowing of the arteries) by having a homogenous endothelial cell lining along the inner surface of the stent coating. Atomic Force Microscopy (AFM) was used to examine live endothelial cells in fluids on a variety of substrates. The objective is to produce a multi-layer drug-incorporated coating that enhances endothelial cell growth. AFM was also used to determine the affect of the coating surface roughness on stent corrosion resistance².

¹ Patent applied for

² M.M. Mazumder, S. De, S. Trigwell, N. Ali, M.K. Mazumder, & J.L. Mehta, "Corrosion resistance of polyurethane-coated nitinol cardiovascular stents", *J. Biomater. Sci. Polymer Edn.*, Vol. 11, 2003, In press



AFM scan of human coronary artery endothelial cell on glass substrate in air.



AFM scan of human coronary artery endothelial cell on glass substrate in fluid.

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Education:

Little Rock Central High school student Mark Mazumder worked on this project, receiving First Place in Engineering at the Intel International Science and Engineering Fair. Mark graduated in June 2003 and is now a freshman at Harvard University. Graduate students Samiran De, Steve Trigwell, and Alex Biris have been using AFM in their Surface Technology course and on their dissertation research. Steve Trigwell received his PhD in December 2002 and is presently a postdoc in the Smart Materials and MEMS group at UALR. Resident Physician Dr. Rahul Nanchal MD, of the University of Arkansas for Medical Sciences (UAMS) Department of Cardiology, also contributed to the work, presenting a seminar in Applications of AFM in Biology to members of UALR and Dr. J.L. Mehta, Director of Cardiovascular Medicine at UAMS, in September 2003.

Outreach:

The Arkansas Science Fair Institute (ASFI) was established by M.K. Mazumder to assist Arkansas high school students with science fair research. Through workshops and other educational events, faculty members mentor students and help them develop significant research plans and gain a greater understanding of career opportunities in science, mathematics, and engineering fields. During the fall of 2003, ASFI is holding four workshops with over 200 students in attendance, representing at least four different schools from three separate school districts. Future plans include expansion of workshop offerings, publication of printed educational materials, establishment of a web site, and recruitment of other Arkansas universities and faculty, so that all students have an opportunity to be exposed to scientific endeavors across the state. Several students will use AFM for their science fair research.